

**METHOD AND STRUCTURE FOR SELF HEALING CRACKS IN UNDERFILL
MATERIAL BETWEEN AN I/C CHIP AND A SUBSTRATE BONDED
TOGETHER WITH SOLDER BALLS**

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ABSTRACT OF THE DISCLOSURE

A method of self-healing cracks in a cured epoxy base underfill material between an I/C chip and a substrate is provided. A plurality of capsules is dispersed in the epoxy base. Each capsule has a curable thermosetting adhesive encapsulated in a rupturable shell to disperse the thermosetting adhesive in a crack in the epoxy base when the shell ruptures. Each capsule is less than 25 microns in diameter. A curing agent that will cause a reaction of the thermosetting adhesive on contact is dispersed in the epoxy to form a cured adhesive in a crack in said epoxy base. The shell will rupture when encountering a crack being propagated in the underfill material, which will at least partially fill the crack with the adhesive, and cure the adhesive with the curing agent to bond the edges of the crack together. The invention also includes the structure for crack self-healing.

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